

# PATENT ABSTRACTS OF JAPAN

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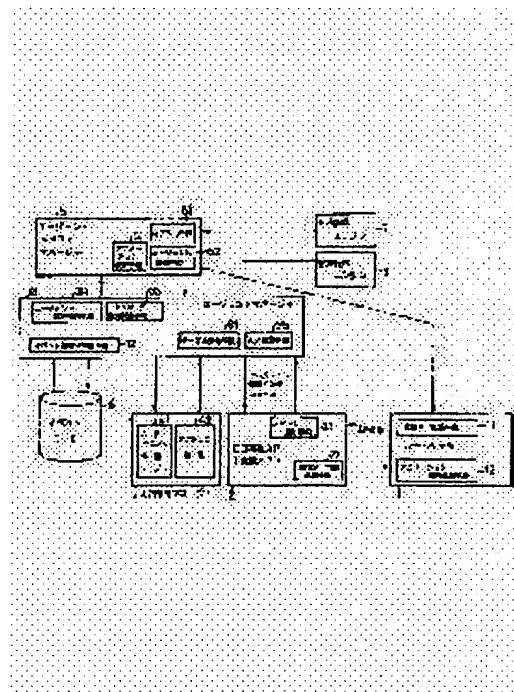
(72)Inventor : NISHIURA MITSURU

## (54) AGENT INTERFACE SYSTEM FOR HOUSEHOLD APPLIANCE PERSONAL COMPUTER

### (57)Abstract:

**PURPOSE:** To establish an agent communication interface between a household appliance AP(application program) and an agent by registering an AP event reference table to the house appliance AP and informing an AP event from the household appliance AP to an agent manager.

**CONSTITUTION:** An AP event reference table 41 of an AP control manager 4 stores information representing an AP event to be information by an household appliance AP 2 to an agent manager 3 corresponding to the household appliance AP (e.g. CD reproduction AP) 2. The agent manager is provided with a table registration means 31 and an event notice means 21, the table registration means 31 registers an application program to the household appliance AP 2 via an AP event reference table 41 of an AP control manager 4, and the event notice means 21 of the house appliance AP 2 informs an AP event to be informed to the agent manager 3 on the basis of the information of the AP event reference table 41 to the agent manager 3.



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**CLAIMS**

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[Claim(s)]

[Claim 1] A multimedia personal computer which is characterized by providing the following and which controls a household-electric-appliances function by household electric appliances AP An agent manager who resides permanently on memory and operates in the background apart from said household electric appliances AP AP control manager including action information corresponding to AP event reference table and AP event holding information which shows AP event of which should correspond to said household electric appliances AP, and said household electric appliances AP should notify said agent manager is prepared. To said agent manager It has a table registration means to obtain said AP event reference table from said AP control manager, and to register with said household electric appliances AP. A notice means of an event to notify said agent manager of AP event of which said agent manager should be notified at said household electric appliances AP based on information on said AP event reference table

[Claim 2] An agent interface method for household-electric-appliances personal computers according to claim 1 characterized by providing the following An event are recording / study means by which said agent manager accumulates / learns AP event from said household electric appliances AP at an event DB A message notification decision means to judge whether said action information is acquired from said AP control manager based on learning information accumulated / learned in said event DB, and a user is notified of a message An agent display directions means to start an agent metaphor manager when it is judged that there is a message of which a user should be notified with this message notification decision means AP control means which acquires said action information from said AP control manager based on a response result of a user from said agent metaphor manager, and controls said household electric appliances AP

[Claim 3] An agent interface method for household-electric-appliances personal computers according to claim 2 with which said agent metaphor manager has a notice means of an agent to notify a message by synthesized speech, an animation display means to display by animation of an agent by whom control of said household electric appliances AP was personified, and a response input means to input a response from a user by speech recognition.

[Claim 4] The agent interface method according to claim 3 for household-electric-appliances personal computers which prepares room shell which is the image of a room where a household-electric-appliances image has been arranged, is equipped with a household-electric-appliances AP starting means start said household electric appliances AP to this room shell, and an animation display-processing means display animation according to household-electric-appliances AP information from said household electric appliances AP, and is equipped with a notice means of household-electric-appliances AP information notify said household-electric-appliances AP information to said household electric appliances AP at said room shell.

[Claim 5] An agent interface method [ equipped with an animation display means by which said agent metaphor manager displays animation in which an agent operates a household-electric-appliances image in said room shell according to a user's response result ] for household-electric-appliances personal computers according to claim 4.

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

[0001]

[Industrial Application] Especially this invention relates to the agent interface method for household-electric-appliances personal computers which offers the user interface environment where actuality is more high, in the multimedia personal computer (only henceforth a household-electric-appliances personal computer) which has household-electric-appliances functions, such as a television receiver (it is hereafter written as TV), facsimile apparatus (it is hereafter written as FAX), a telephone, and a compact disk (it is hereafter written as CD) regenerative apparatus, about the agent interface method for household-electric-appliances personal computers.

[0002]

[Description of the Prior Art] In the conventional household-electric-appliances personal computer, the household-electric-appliances application program (it is hereafter written as household electric appliances AP) which controls a household-electric-appliances function is installed, it registers as an icon, and household electric appliances AP are started by the click of an icon.

[0003] Although technology which enables actuation personified using the agent (function to operate as if the surrogate needed the demand and notice to a user from a user on the computer) was also realized, there was no agent who intervenes between household electric appliances AP and a user, and the interface of a user and an agent was only a text display about the output, and was only an input from a mouse or a keyboard about the input.

[0004] Furthermore, although it was possible to have started household electric appliances AP from the shell (henceforth room shell) which imagined the room aligned with a user's use gestalt / targets (a child, business, family, etc.) When room shell was displayed to the limit of a screen, or when the household electric appliances AP started from room shell were no longer displayed on a background the surroundings, the condition of the current household electric appliances AP did not need to be found, but the user needed to change household electric appliances AP.

[0005]

[Problem(s) to be Solved by the Invention] In the conventional household-electric-appliances personal computer mentioned above, since household electric appliances AP were started by registering household electric appliances AP as an icon, and clicking on an icon, it differs from starting actuation of actual household electric appliances greatly, and especially the beginner had the trouble that actuation was unclear.

[0006] Moreover, since the notice performed to a user is only a text display and the response input from a user was not able to perform only a mouse or a keyboard in mustard, either, when the condition of household electric appliances AP changed, it differs from the operability of actual household electric appliances, and especially the beginner had the trouble that actuation was unclear.

[0007] Furthermore, when room shell was displayed to the limit of a screen, or when it enabled it to start household electric appliances AP from room shell, and the household electric appliances AP started from room shell turned to a background, there was a trouble that the condition of household electric appliances AP was no longer displayed.

[0008] The purpose of this invention is to offer the agent interface method for household-electric-appliances personal computers which established the agent communication interface between household electric appliances AP and an agent, as AP event reference table is registered into household electric appliances AP and an agent manager is notified of AP event from household electric appliances AP in view of an above-mentioned point.

[0009] Moreover, other purposes of this invention are to offer the agent interface method for household-electric-appliances personal computers which brought more the interface of a household-electric-appliances personal computer and human being close to human being, as voice input can perform response and control of household electric appliances AP from a user while being made to notify a user by an active animation display and speech synthesis of a

message from an agent.

[0010] Furthermore, display the condition of household electric appliances AP into the household-electric-appliances image in room shell, and it enables it to get to know the condition of household electric appliances AP with the sensation near actual household electric appliances, and is in offering the agent interface method for household-electric-appliances personal computers which raised the convenience of a household-electric-appliances function.

[0011]

[Means for Solving the Problem] An agent interface method for household-electric-appliances personal computers of this invention In a multimedia personal computer which controls a household-electric-appliances function by household electric appliances AP With an agent manager who resides permanently on memory and operates in the background apart from said household electric appliances AP AP control manager including action information corresponding to AP event reference table and AP event holding information which shows AP event of which should correspond to said household electric appliances AP, and said household electric appliances AP should notify said agent manager is prepared. To said agent manager It has a table registration means to obtain said AP event reference table from said AP control manager, and to register with said household electric appliances AP. It has a notice means of an event to notify said agent manager of AP event of which said agent manager should be notified at said household electric appliances AP based on information on said AP event reference table.

[0012] Moreover, an agent interface method for household-electric-appliances personal computers of this invention An event are recording / study means by which said agent manager accumulates / learns AP event from said household electric appliances AP at Event DB, A message notification decision means to judge whether said action information is acquired from said AP control manager based on learning information accumulated / learned in said event DB, and a user is notified of a message, An agent display directions means to start an agent metaphor manager when it is judged that there is a message of which a user should be notified with this message notification decision means, It has AP control means which acquires said action information from said AP control manager based on a response result of a user from said agent metaphor manager, and controls said household electric appliances AP. Said agent metaphor manager has a notice means of an agent to notify a message by synthesized speech, an animation display means to display by animation of an agent by whom control of said household electric appliances AP was personified, and a response input means to input a response from a user by speech recognition.

[0013] Furthermore, an agent interface method for household-electric-appliances personal computers of this invention prepares room shell which is the image of a room where a household-electric-appliances image has been arranged, is equipped with a household-electric-appliances AP starting means start said household electric appliances AP to this room shell, and an animation display-processing means display animation according to household-electric-appliances AP information from said household electric appliances AP, and is equipped with a notice means of household-electric-appliances AP information notify said household-electric-appliances AP information to said household electric appliances AP at said room shell. Said agent metaphor manager has an animation display means to display animation in which an agent operates a household-electric-appliances image in said room shell according to a user's response result.

[0014]

[Function] By the agent interface method for household-electric-appliances personal computers of this invention In the interface of household-electric-appliances functions, such as TV, FAX, a telephone, and CD regenerative apparatus, and a user The household electric appliances AP (the TV control AP, the FAX control AP, the telephone control AP, CD playback AP, etc.) and agent whom a user operates become the relation between a client and a server. AP event reference table holding AP event of which household electric appliances AP should notify an agent manager is registered into household electric appliances AP, and AP event which household electric appliances AP should notify with reference to AP event reference table is sent to an agent manager.

[0015] Moreover, when an agent manager needs to accumulate / learn AP event and needs to notify a user of a message according to the result, speech synthesis and a text display inform a user for the personified agent of a message through a graphical interface, the response from a user is inputted by speech recognition, and an agent manager controls household electric appliances AP according to the response result from a user.

[0016] Furthermore, when household electric appliances AP are started from the environment of the room shell of the image of the room where the household-electric-appliances image has been arranged, AP event from household electric appliances AP is notified to an agent manager and room shell. When an agent manager needs to notify a user of a message, an agent is displayed in the form suitable for the image of room shell, animation in which an agent operates the household electric appliances AP in room shell by a user's response is carried out, and household electric appliances AP are operated.

[0017]

[Example] Next, this invention is explained in details with reference to a drawing.

[0018] Drawing 2 is a block diagram which illustrates the hardware configuration of the household-electric-appliances personal computer 100 with which the agent interface method for household-electric-appliances personal computers concerning one example of this invention is carried. this household-electric-appliances personal computer 100 -- the central-process unit (it is hereafter written as CPU) 101, memory 102, a bus 103, the pulse-code-modulation (it is hereafter written as PCM) sound codec 104, the CD-ROM (read-only memory) drive 105, the FAX modem board 106, TV tuner board 107, a sound mixer 108, a microphone 109, a loudspeaker 110, and telephone modular -- it is constituted including 111. Moreover, a display 112, a keyboard 113, and a mouse 114 are connected to the household-electric-appliances personal computer 100, and a telephone 115 can connect now with it alternatively.

[0019] Drawing 1 is the block diagram showing the configuration of the agent interface method for household-electric-appliances personal computers concerning one example of this invention. As for the agent interface method for household-electric-appliances personal computers of this example, the principal part consists of the room shell 1, the CD playback (household electric appliances AP) AP 2 and the agent manager 3, AP control manager 4, the agent metaphor manager 5, an event data base (it is hereafter written as Event DB) 6, a speech recognition engine 7, and a speech synthesis engine 8.

[0020] The room shell 1 is constituted including a household-electric-appliances AP starting means 11 to start household electric appliances AP, and an animation display-processing means 12 to display animation according to the household-electric-appliances AP information from household electric appliances AP. The room shell 1 is shell by which the household-electric-appliances image suitable for the image of the room is already registered into the image of the room, as illustrated to drawing 5 - drawing 8. For example, if it is living, household-electric-appliances images, such as a telephone and FAX, will be placed into the room. If the household-electric-appliances image is clicked in mouse 114 grade, the household electric appliances AP related with the household-electric-appliances image clicked by the household-electric-appliances AP starting means 11 will start. For example, a click of a telephone image starts the telephone control AP.

[0021] The CD playbacks AP 2 as household electric appliances AP are the management/control section of the background which performs status management/control of CD-ROM drive 105, and are constituted including a notice means 21 of an event to notify the agent manager 3 of AP event based on the information on AP event reference table 41 mentioned later, and a notice means 22 of household-electric-appliances AP information to notify household-electric-appliances AP information to the room shell 1.

[0022] They are the management/control section which the agent manager 3 resides permanently on memory 102, operates as the background, and manages / controls an agent. A table registration means 31 to obtain AP event reference table 41 from AP control manager 4, and to register with household electric appliances AP, An event are recording / study means 32 to accumulate / learn AP event from household electric appliances AP at an event DB6, A message notification decision means 33 to judge whether the action information 42 is acquired from AP control manager 4 based on the learning information accumulated / learned in an event DB6, and a user is notified of a message, When it is judged that there is a message of which a user should be notified with the message notification decision means 33, it is constituted including an agent display directions means 34 to start the agent metaphor manager 5, and the AP control means 35 which controls household electric appliances AP.

[0023] AP control manager 4 is constituted including AP event reference table 41 and the action information 42.

[0024] Household electric appliances AP are the tables holding the information which shows AP event of which the agent manager 3 should be notified, and AP event reference table 41 is held as an AP event which should notify the notice of a condition of a menu selection event, a menu activation event, a carbon button selection event, file read in information, file write-in information, a mouse event, a key event, and AP proper, the state control of AP, and AP actuation activation, as shown in drawing 3.

[0025] The action information 42 is the information it was described to be for every household electric appliances AP how household electric appliances AP or an agent was controlled by the response from the message and user to the notice from household electric appliances AP and a user etc. The action information 42 is AP name (CDPLAY.EXE), the notice (notice of playback termination) from AP, and a user informative message ("CD playback was completed."), when AP control manager 4 is a thing corresponding to the CD playback AP 2. Does it reproduce from the beginning? It consists of ", response alternative (it is and "is [ "and ] "no"), and an AP control script (it is and "is "-USH REPLAY and "no":TRAY OPEN & SAVE DB).

[0026] An agent metaphor manager 5 says the user interface portion of the foreground which performs a response/notice with a real user, and is constituted including an animation display means 51 display by the animation of the agent who had control of household electric appliances AP personified, a notice means 52 of an agent notify a

message by synthesized speech through the speech-synthesis engine 8, and a response input means 53 input the response from a user through the speech-recognition engine 7 (or a keyboard 113/a mouse 114).

[0027] In the CD playback AP 2, an event DB6 consists of AP name (CD playback AP name: CDPLAY.EXE), the class (the unique identifier for every CD: 1234343-334535) of CD, skip information (information on where the skip carbon button was pushed: 1, 5, 7), and an agent response indication (having answered how to the question from an agent, or : being) as learning information.

[0028] If drawing 4 is referred to, the processing by the side of household electric appliances AP will consist of AP starting step S101, the communication demand (initialization) step S102 to an agent, AP event reference table registration step S103, the notice step S104 of AP event, the demand processing step S105, a notice step S106 of communication termination, and an AP termination step S107. In addition, a household-electric-appliances AP side means the CD playback AP 2 and the room shell 1.

[0029] Similarly, if drawing 4 is referred to, the processing by the side of an agent will consist of the communication establishment step S201, AP control manager Rhodes tetraethylpyrophosphate S202, the notice step S203 of AP event reference table, AP event are recording step S204, an AP control step S205, and an AP control manager unload step S206. In addition, an agent side means the agent manager 3 and the agent metaphor manager 5.

[0030] Next, actuation of the agent interface method for household-electric-appliances personal computers of this example constituted in this way is explained. In addition, the case where a user starts the CD playback AP 2 from the inside of the room shell 1 is taken for an example, and it explains here, referring to drawing 5 - drawing 8.

[0031] Drawing 5 is drawing showing the image of the room shell 1 by which the household-electric-appliances image has been arranged. At the time of starting of the room shell 1, the agent manager 3 resides permanently on memory 102, and it is operating in the background.

[0032] If a user positions a mouse cursor in CD regenerative-apparatus image in the room shell 1 and clicks a mouse 114, as shown in drawing 6, the room shell 1 will start the CD playback AP 2 with the household-electric-appliances AP starting means 11, and will expand CD regenerative-apparatus image (window) (step S101).

[0033] If the CD playback AP 2 is started, it will require communication of the agent manager 3 through an agent communication interface (step S102), and will require AP event reference table 41 of the agent manager 3.

[0034] The agent manager 3 establishes communication to the demand of AP event reference table 41 (step 201), loads AP control manager 4 corresponding to the CD playback AP 2 on memory 102 (step S202), pulls out AP event reference table 41 from AP control manager 4, and notifies AP event reference table 41 to the CD playback AP 2 with the table registration means 31 (step S203).

[0035] The CD playback AP 2 registers AP event reference table 41 notified by the agent manager 3 (step S103).

[0036] Then, the CD playback AP 2 notifies the agent manager 3 of required AP events (the class of current playback CD, a playback location, playback termination, skip information on the music by the user, etc.) with the notice means 21 of an event based on AP event reference table 41 (step S104). Moreover, the CD playback AP 2 notifies playback positional information to the room shell 1 with the notice means 22 of household-electric-appliances AP information.

[0037] The room shell 1 will display a playback location into CD regenerative-apparatus image with the animation display-processing means 12, if playback positional information is received from the CD playback AP 2. Here, when the user clicked the minimize button of CD regenerative-apparatus image and made CD regenerative-apparatus image minimize from the condition of the room shell 1 shown in drawing 6, or even when it clicks the room shell 1 and activates, the room shell 1 carries out the reduced display of the present truck and the time amount of CD into CD regenerative-apparatus image with the animation display-processing means 12, as shown in drawing 7. By this, the condition of the CD playback AP 2 will always be displayed in the room shell 1.

[0038] When a user clicks CD regenerative-apparatus image by which the enlarged display was carried out, the CD playback AP 2 is operated and the music of CD under playback is skipped during playback of CD, the CD playback AP 2 notifies the agent manager 3 of the class and skip information on CD as an AP event with the notice means 21 of an event (step S104).

[0039] The agent manager 3 accumulates the class and skip information on CD in an event DB6 with event are recording / study means 32 (step S204).

[0040] Termination of playback of CD notifies the agent manager 3 of playback of CD having ended the CD playback AP 2 with the notice means 21 of an event (step S104).

[0041] The agent manager 3 will judge whether ejection and the message notification decision means 33 need to inform a user for the action information 42 over CD playback termination in AP control manager 4 of the message in the action information 42, if the notice of playback termination is received. Judging that it is necessary to notify a message in the case of the action information 42 over the notice of playback termination, the agent manager 3 hands access



information 42 with the agent display directions means 34, and starts the agent metaphor manager 5.

[0042] When the EJIEN metaphor manager 5 was started, as shown in drawing 8, he displayed the agent in the room shell 1 with the animation display means 51 based on the passed action information 42, and playback of "CD finished [ the agent ] him to the user. Once again, does it reproduce from the beginning? While carrying out the text display of the message ", the notice means 52 of an agent informs a user of the message by synthesized speech through the speech synthesis engine 8, and it goes into the response waiting from a user.

[0043] When a user answers with "yes" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation which an agent walks to CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and pushes the playback carbon button in CD regenerative-apparatus image, and ends.

[0044] AP control script corresponding to [ the agent manager 3 is in response alternative" from the action information 42 in response to a response result, and ] "-- "PUSH REPLAY" is taken out and the AP control means 35 notifies to the CD playback AP 2 as a CD playback command (step S205).

[0045] The CD playback AP 2 will play CD from the beginning, if CD playback command is received (step S105).

[0046] On the other hand, when a user answers with "no" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation to which an agent takes out CD from CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and ends.

[0047] Control script "TRAY OPEN &SAVE DB" is taken out. the agent manager 3 -- a response result -- winning popularity -- the response alternative from the action information 42 -- AP corresponding to "no" -- While notifying the command which opens CD tray by the AP control means 35 to the CD playback AP 2 (step S205), the class of CD which was being now played with event are recording / study means 32 and the information on the purport that a user was not reincarnated again are accumulated in an event DB6.

[0048] If the command which opens CD tray is received, the CD playback AP 2 will make open CD tray of CD-ROM drive 105, and the exchange to the following CD will be urged to it.

[0049] When a user tries to play the same CD next time, the agent manager 3 is notified of the CD playback AP 2 by making into AP event the class of CD played with the notice means 21 of an event based on AP event reference table 41 (step S104).

[0050] The agent manager 3 searches how it is for whether there is any learning information of the same CD as an event DB6 by event are recording / study means 32 by using the class of notified CD as a key. If there is learning information of the same CD and the skip information on CD is in the learning information, the agent manager 3 will judge whether ejection and the message notification decision means 33 inform a user for the action information 42 over same CD playback in AP control manager 4 of the message in the action information 42. Judging that a message is notified in same CD playback, the agent manager 3 hands the action information 42 with the agent display directions means 34, and starts the agent metaphor manager 5.

[0051] The EJIEN metaphor manager 5 notifies a user of that message by synthesized speech through the speech synthesis engine 8 with the notice means 52 of an agent, and goes into the response waiting from a user while it will display an agent in the room shell 1 with the animation display means 51 based on the passed action information 42 and an agent will do the text display of the message "whether it reproduces in the sequence which heard this CD before" to a user, if started.

[0052] When a user answers with "yes" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation which an agent walks to CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and pushes a playback carbon button, and ends.

[0053] In response to a response result, the agent manager 3 is in response alternative" from the action information 42, acquires skip information for AP control script corresponding to "from an event DB6 with ejection and event are recording / study means 32, and notifies CD playback command which shows reproductive \*\*\*\* by the AP control means 35 to the CD playback AP 2 (step S205).

[0054] The CD playback AP 2 will be reproduced along with \*\*\*\* CD playback command indicates CD to be, if CD playback command which shows reproductive \*\*\*\* is received (step S105).

[0055] On the other hand, when a user answers with "no" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation which an agent walks to CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and pushes a playback carbon button, and ends.



[0056] the agent manager 3 -- a response result -- winning popularity -- the response alternative from the action information 42 -- AP control script corresponding to "no" -- ejection -- While accumulating the information on the purport which was not reproduced in the sequence which the class and user of CD played with event are recording / study means 32 heard before that CD was in an event DB6 CD playback command which reproduces music from the beginning by the AP control means 35 is notified to the CD playback AP 2 (step S205).

[0057] The CD playback AP 2 will play CD from the beginning, if CD playback command is received (step S105).

[0058] On the other hand, in terminating the CD playback AP 2, it clicks the termination carbon button in CD regenerative-apparatus image to which the enlarged display of [ in the room shell 1 ] was carried out. Then, the reduced display of the CD regenerative-apparatus image is carried out within the room shell 1, the notice of communication termination is told to the agent manager 3 from the CD playback AP 2 (step S106), and the CD playback AP 2 ends processing (step S107).

[0059] The agent manager 3 will do the unload of the AP control manager 4 corresponding to the CD playback AP 2 from memory 102, if the notice of communication termination is received (step S206).

[0060] In addition, although explanation of actuation of the above-mentioned example explained as an example of household electric appliances AP taking the case of the case of the CD playback AP 2, it cannot be overemphasized that it becomes the actuation which is mostly similar also in the case of telephone control [ the FAX control AP, the TV control AP, ] AP.

[0061]

[Effect of the Invention] As explained above, this invention is effective in the agent communication interface between household electric appliances AP and an agent manager being easily establishable by registering AP event reference table into household electric appliances AP with an agent manager's table registration means, and having notified the agent manager of AP event from household electric appliances AP with the notice means of an event of household electric appliances AP.

[0062] Moreover, while an agent metaphor manager's animation display means performs an active animation display from an agent and speech synthesis is made to inform a user with the notice means of an agent, when it could be made to perform response input in the voice from a user, and control of household electric appliances AP with a response input means, it is effective in the ability to bring more the interface of a household-electric-appliances personal computer and human being close to human being. Especially, a beginner's degree of comprehension improves.

[0063] Furthermore, by having displayed the condition of household electric appliances AP into the household-electric-appliances image in room shell with the animation display-processing means of room shell, the condition of household electric appliances AP can be known with the sensation near actual household electric appliances, and it is effective in the ability to raise the convenience of an agent metaphor manager and a household-electric-appliances function.

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TECHNICAL FIELD

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[Industrial Application] Especially this invention relates to the agent interface method for household-electric-appliances personal computers which offers the user interface environment where actuality is more high, in the multimedia personal computer (only henceforth a household-electric-appliances personal computer) which has household-electric-appliances functions, such as a television receiver (it is hereafter written as TV), facsimile apparatus (it is hereafter written as FAX), a telephone, and a compact disk (it is hereafter written as CD) regenerative apparatus, about the agent interface method for household-electric-appliances personal computers.

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PRIOR ART

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[0004] Furthermore, shell which imagined the room aligned with a user's use gestalt / targets (a child, business, family, etc.) Although it was possible to have started household electric appliances AP from (it is hereafter called room shell), when room shell was displayed to the limit of a screen, or when the household electric appliances AP started from room shell were no longer displayed on a background the surroundings, the condition of the current household electric appliances AP did not need to be found, but the user needed to change household electric appliances AP.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As explained above, this invention is effective in the agent communication interface between household electric appliances AP and an agent manager being easily establishable by registering AP event reference table into household electric appliances AP with an agent manager's table registration means, and having notified the agent manager of AP event from household electric appliances AP with the notice means of an event of household electric appliances AP.

[0062] Moreover, while an agent metaphor manager's animation display means performs an active animation display from an agent and speech synthesis is made to inform a user with the notice means of an agent, when it could be made to perform response input in the voice from a user, and control of household electric appliances AP with a response input means, it is effective in the ability to bring more the interface of a household-electric-appliances personal computer and human being close to human being. Especially, a beginner's degree of comprehension improves.

[0063] Furthermore, by having displayed the condition of household electric appliances AP into the household-electric-appliances image in room shell with the animation display-processing means of room shell, the condition of household electric appliances AP can be known with the sensation near actual household electric appliances, and it is effective in the ability to raise the convenience of an agent metaphor manager and a household-electric-appliances function.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] In the conventional household-electric-appliances personal computer mentioned above, since household electric appliances AP were started by registering household electric appliances AP as an icon, and clicking on an icon, it differs from starting actuation of actual household electric appliances greatly, and especially the beginner had the trouble that actuation was unclear.

[0006] Moreover, since the notice performed to a user is only a text display and the response input from a user was not able to perform only a mouse or a keyboard in mustard, either, when the condition of household electric appliances AP changed, it differs from the operability of actual household electric appliances, and especially the beginner had the trouble that actuation was unclear.

[0007] Furthermore, when room shell was displayed to the limit of a screen, or when it enabled it to start household electric appliances AP from room shell, and the household electric appliances AP started from room shell turned to a background, there was a trouble that the condition of household electric appliances AP was no longer displayed.

[0008] The purpose of this invention is to offer the agent interface method for household-electric-appliances personal computers which established the agent communication interface between household electric appliances AP and an agent, as AP event reference table is registered into household electric appliances AP and an agent manager is notified of AP event from household electric appliances AP in view of an above-mentioned point.

[0009] Moreover, other purposes of this invention are to offer the agent interface method for household-electric-appliances personal computers which brought more the interface of a household-electric-appliances personal computer and human being close to human being, as voice input can perform response and control of household electric appliances AP from a user while being made to notify a user by an active animation display and speech synthesis of a message from an agent.

[0010] Furthermore, display the condition of household electric appliances AP into the household-electric-appliances image in room shell, and it enables it to get to know the condition of household electric appliances AP with the sensation near actual household electric appliances, and is in offering the agent interface method for household-electric-appliances personal computers which raised the convenience of a household-electric-appliances function.

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MEANS

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[Means for Solving the Problem] An agent interface method for household-electric-appliances personal computers of this invention In a multimedia personal computer which controls a household-electric-appliances function by household electric appliances AP With an agent manager who resides permanently on memory and operates in the background apart from said household electric appliances AP AP control manager including action information corresponding to AP event reference table and AP event holding information which shows AP event of which should correspond to said household electric appliances AP, and said household electric appliances AP should notify said agent manager is prepared. To said agent manager It has a table registration means to obtain said AP event reference table from said AP control manager, and to register with said household electric appliances AP. It has a notice means of an event to notify said agent manager of AP event of which said agent manager should be notified at said household electric appliances AP based on information on said AP event reference table.

[0012] Moreover, it is characterized by equipping an agent interface method for household-electric-appliances personal computers of this invention with the following. An event are recording / study means by which said agent manager accumulates / learns AP event from said household electric appliances AP at Event DB A message notification decision means to judge whether said action information is acquired from said AP control manager based on learning information accumulated / learned in said event DB, and a user is notified of a message An agent display directions means to start an agent metaphor manager when it is judged that there is a message of which a user should be notified with this message notification decision means AP control means which acquires said action information from said AP control manager based on a response result of a user from said agent metaphor manager, and controls said household electric appliances AP Said agent metaphor manager has a notice means of an agent to notify a message by synthesized speech, an animation display means to display by animation of an agent by whom control of said household electric appliances AP was personified, and a response input means to input a response from a user by speech recognition.

[0013] Furthermore, an agent interface method for household-electric-appliances personal computers of this invention prepares room shell which is the image of a room where a household-electric-appliances image has been arranged, is equipped with a household-electric-appliances AP starting means start said household electric appliances AP to this room shell, and an animation display-processing means display animation according to household-electric-appliances AP information from said household electric appliances AP, and is equipped with a notice means of household-electric-appliances AP information notify said household-electric-appliances AP information to said household electric appliances AP at said room shell. Said agent metaphor manager has an animation display means to display animation in which an agent operates a household-electric-appliances image in said room shell according to a user's response result.

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OPERATION

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[Function] By the agent interface method for household-electric-appliances personal computers of this invention In the interface of household-electric-appliances functions, such as TV, FAX, a telephone, and CD regenerative apparatus, and a user The household electric appliances AP (the TV control AP, the FAX control AP, the telephone control AP, CD playback AP, etc.) and agent whom a user operates become the relation between a client and a server. AP event reference table holding AP event of which household electric appliances AP should notify an agent manager is registered into household electric appliances AP, and AP event which household electric appliances AP should notify with reference to AP event reference table is sent to an agent manager.

[0015] Moreover, when an agent manager needs to accumulate / learn AP event and needs to notify a user of a message according to the result, speech synthesis and a text display inform a user for the personified agent of a message through a graphical interface, the response from a user is inputted by speech recognition, and an agent manager controls household electric appliances AP according to the response result from a user.

[0016] Furthermore, when AP event from household electric appliances AP is notified to an agent manager and room shell when household electric appliances AP are started from the environment of the room shell of the image of a chamber where the household-electric-appliances image has been arranged, and an agent manager needs to notify a user of a message, an agent is displayed in the form suitable for the image of room shell, and it is a user's response. An agent carries out animation which operates the household electric appliances AP in room shell, and operates household electric appliances AP.

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EXAMPLE

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[Example] Next, this invention is explained to details with reference to a drawing.

[0018] Drawing 2 is a block diagram which illustrates the hardware configuration of the household-electric-appliances personal computer 100 with which the agent interface method for household-electric-appliances personal computers concerning one example of this invention is carried. this household-electric-appliances personal computer 100 -- the central-process unit (it is hereafter written as CPU) 101, memory 102, a bus 103, the pulse-code-modulation (it is hereafter written as PCM) sound codec 104, the CD-ROM (read-only memory) drive 105, the FAX modem board 106, TV tuner board 107, a sound mixer 108, a microphone 109, a loudspeaker 110, and telephone modular -- it is constituted including 111. Moreover, a display 112, a keyboard 113, and a mouse 114 are connected to the household-electric-appliances personal computer 100, and a telephone 115 can connect now with it selectively.

[0019] Drawing 1 is the block diagram showing the configuration of the agent interface method for household-electric-appliances personal computers concerning one example of this invention. As for the agent interface method for household-electric-appliances personal computers of this example, the body consists of the room shell 1, the CD playback (household electric appliances AP) AP 2 and the agent manager 3, AP control manager 4, the agent metaphor manager 5, an event data base (it is hereafter written as Event DB) 6, a speech recognition engine 7, and a speech synthesis engine 8.

[0020] The room shell 1 is constituted including a household-electric-appliances AP starting means 11 to start household electric appliances AP, and an animation display-processing means 12 to display animation according to the household-electric-appliances AP information from household electric appliances AP. The room shell 1 is shell by which the household-electric-appliances image suitable for the image of the chamber is already registered into the image of a chamber, as illustrated to drawing 5 - drawing 8. For example, if it is living, household-electric-appliances images, such as a telephone and FAX, will be placed into a chamber. If the household-electric-appliances image is clicked in mouse 114 grade, the household electric appliances AP related with the household-electric-appliances image clicked by the household-electric-appliances AP starting means 11 will start. For example, a click of a telephone image starts the telephone control AP.

[0021] The CD playbacks AP 2 as household electric appliances AP are the management/control section of the background which performs status management/control of CD-ROM drive 105, and are constituted including an advice means 21 of an event to notify the agent manager 3 of AP event based on the information on AP event reference table 41 mentioned later, and an advice means 22 of household-electric-appliances AP information to notify household-electric-appliances AP information to the room shell 1.

[0022] They are the management/control section which the agent manager 3 resides permanently on memory 102, operates as the background, and manages / controls an agent. A table registration means 31 to obtain AP event reference table 41 from AP control manager 4, and to register with household electric appliances AP, An event are recording / study means 32 to accumulate / learn AP event from household electric appliances AP at an event DB6, A message notification decision means 33 to judge whether the action information 42 is acquired from AP control manager 4 based on the learning information accumulated / learned in an event DB6, and a user is notified of a message, When it is judged that there is a message of which a user should be notified with the message notification decision means 33, it is constituted including an agent display directions means 34 to start the agent metaphor manager 5, and the AP control means 35 which controls household electric appliances AP.

[0023] AP control manager 4 is constituted including AP event reference table 41 and the action information 42.

[0024] Household electric appliances AP are the tables holding the information which shows AP event of which the agent manager 3 should be notified, and AP event reference table 41 is held as an AP event which should notify the advice of a condition of a menu selection event, a menu activation event, a carbon button selection event, file read in

information, file write-in information, a mouse event, a key event, and AP proper, the state control of AP, and AP actuation activation, as shown in drawing 3.

[0025] The action information 42 is the information it was described to be for every household electric appliances AP how household electric appliances AP or an agent was controlled by the response from the message and user to the advice from household electric appliances AP and a user etc. The action information 42 is AP name (CDPLAY.EXE), the advice (advice of playback termination) from AP, and a user informative message ("CD playback was completed."), when AP control manager 4 is a thing corresponding to the CD playback AP 2. Does it reproduce from the beginning? It consists of ", response alternative (it is and "is [ "and ] "no"), and an AP control script (it is and "is "-USH REPLAY and "no":TRAY OPEN & SAVE DB).

[0026] An agent metaphor manager 5 says the user interface portion of the foreground which performs response/advice with a real user, and is constituted including an animation display means 51 display by the animation of the agent who had control of household electric appliances AP personified, an advice means 52 of an agent notify a message by synthesized speech through the speech-synthesis engine 8, and a response input means 53 input the response from a user through the speech-recognition engine 7 (or a keyboard 113/a mouse 114).

[0027] In the CD playback AP 2, an event DB6 consists of AP name (CD playback AP name: CDPLAY.EXE), the class (the unique identifier for every CD: 1234343-334535) of CD, skip information (information on where the skip carbon button was pushed: 1, 5, 7), and an agent response indication (having answered how to the question from an agent, or : being) as learning information.

[0028] If drawing 4 is referred to, the processing by the side of household electric appliances AP will consist of AP starting step S101, the communication demand (initialization) step S102 to an agent, AP event reference table registration step S103, the advice step S104 of AP event, the demand processing step S105, an advice step S106 of communication termination, and an AP termination step S107. In addition, a household-electric-appliances AP side means the CD playback AP 2 and the room shell 1.

[0029] Similarly, if drawing 4 is referred to, the processing by the side of an agent will consist of the communication establishment step S201, AP control manager Rhodes tetraethylpyrophosphate S202, the advice step S203 of AP event reference table, AP event are recording step S204, an AP control step S205, and an AP control manager unload step S206. In addition, an agent side means the agent manager 3 and the agent metaphor manager 5.

[0030] Next, actuation of the agent interface method for household-electric-appliances personal computers of this example constituted in this way is explained. In addition, the case where a user starts the CD playback AP 2 from the inside of the room shell 1 is taken for an example, and it explains here, referring to drawing 5 - drawing 8.

[0031] Drawing 5 is drawing showing the image of the room shell 1 by which the household-electric-appliances image has been arranged. At the time of starting of the room shell 1, the agent manager 3 resides permanently on memory 102, and it is operating in the background.

[0032] If a user positions a mouse cursor in CD regenerative-apparatus image in the room shell 1 and clicks a mouse 114, as shown in drawing 6, the room shell 1 will start the CD playback AP 2 with the household-electric-appliances AP starting means 11, and will expand CD regenerative-apparatus image (window) (step S101).

[0033] If the CD playback AP 2 is started, it will require communication of the agent manager 3 through an agent communication interface (step S102), and will require AP event reference table 41 of the agent manager 3.

[0034] The agent manager 3 establishes communication to the demand of AP event reference table 41 (step 201), loads AP control manager 4 corresponding to the CD playback AP 2 on memory 102 (step S202), pulls out AP event reference table 41 from AP control manager 4, and notifies AP event reference table 41 to the CD playback AP 2 with the table registration means 31 (step S203).

[0035] The CD playback AP 2 registers AP event reference table 41 notified by the agent manager 3 (step S103).

[0036] Then, the CD playback AP 2 notifies the agent manager 3 of required AP events (the class of current playback CD, a playback location, playback termination, skip information on the music by the user, etc.) with the advice means 21 of an event based on AP event reference table 41 (step S104). Moreover, the CD playback AP 2 notifies playback positional information to the room shell 1 with the advice means 22 of household-electric-appliances AP information.

[0037] The room shell 1 will display a playback location into CD regenerative-apparatus image with the animation display-processing means 12, if playback positional information is received from the CD playback AP 2. Here, when the user clicked the minimize button of CD regenerative-apparatus image and made CD regenerative-apparatus image minimize from the condition of the room shell 1 shown in drawing 6, or even when it clicks the room shell 1 and activates, the room shell 1 carries out the reduced display of the present truck and the time amount of CD into CD regenerative-apparatus image with the animation display-processing means 12, as shown in drawing 7. By this, the condition of the CD playback AP 2 will always be displayed in the room shell 1.

[0038] When a user clicks CD regenerative-apparatus image by which the enlarged display was carried out, the CD playback AP 2 is operated and the music of CD under playback is skipped during playback of CD, the CD playback AP 2 notifies the agent manager 3 of the class and skip information on CD as an AP event with the advice means 21 of an event (step S104).

[0039] The agent manager 3 accumulates the class and skip information on CD in an event DB6 with event are recording / study means 32 (step S204).

[0040] Termination of playback of CD notifies the agent manager 3 of playback of CD having ended the CD playback AP 2 with the advice means 21 of an event (step S104).

[0041] The agent manager 3 will judge whether ejection and the message notification decision means 33 need to inform a user for the action information 42 over CD playback termination in AP control manager 4 of the message in the action information 42, if advice of playback termination is received. Judging that it is necessary to notify a message in the case of the action information 42 over advice of playback termination, the agent manager 3 hands access information 42 with the agent display directions means 34, and starts the agent metaphor manager 5.

[0042] When the EJIEN metaphor manager 5 was started, as shown in drawing 8, he displayed the agent in the room shell 1 with the animation display means 51 based on the passed action information 42, and playback of "CD finished [ the agent ] him to the user. Once again, does it reproduce from the beginning? While carrying out the text display of the message ", the advice means 52 of an agent informs a user of the message by synthesized speech through the speech synthesis engine 8, and it goes into the response waiting from a user.

[0043] When a user answers with "yes" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation which an agent walks to CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and pushes the playback carbon button in CD regenerative-apparatus image, and ends.

[0044] AP control script corresponding to [ the agent manager 3 is in response alternative" from the action information 42 in response to a response result, and ] "-- "PUSH REPLAY" is taken out and the AP control means 35 notifies to the CD playback AP 2 as a CD playback command (step S205).

[0045] The CD playback AP 2 will play CD from the beginning, if CD playback command is received (step S105).

[0046] On the other hand, when a user answers with "no" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation to which an agent takes out CD from CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and ends.

[0047] Control script"TRAY OPEN &SAVE DB" is taken out. the agent manager 3 -- a response result -- winning popularity -- the response alternative from the action information 42 -- AP corresponding to "no" -- While notifying the command which opens CD tray by the AP control means 35 to the CD playback AP 2 (step S205), the class of CD which was being now played with event are recording / study means 32 and the information on the purport that a user was not reincarnated again are accumulated in an event DB6.

[0048] If the command which opens CD tray is received, the CD playback AP 2 will make open CD tray of CD-ROM drive 105, and the exchange to the following CD will be urged to it.

[0049] When a user tries to play the same CD next time, the agent manager 3 is notified of the CD playback AP 2 by making into AP event the class of CD played with the advice means 21 of an event based on AP event reference table 41 (step S104).

[0050] The agent manager 3 searches how it is for whether there is any learning information of the same CD as an event DB6 by event are recording / study means 32 by using the class of notified CD as a key. If there is learning information of the same CD and the skip information on CD is in the learning information, the agent manager 3 will judge whether ejection and the message notification decision means 33 inform a user for the action information 42 over same CD playback in AP control manager 4 of the message in the action information 42. Judging that a message is notified in same CD playback, the agent manager 3 hands the action information 42 with the agent display directions means 34, and starts the agent metaphor manager 5.

[0051] The EJIEN metaphor manager 5 notifies a user of that message by synthesized speech through the speech synthesis engine 8 with the advice means 52 of an agent, and goes into the response waiting from a user while it will display an agent in the room shell 1 with the animation display means 51 based on the passed action information 42 and an agent will do the text display of the message "whether it reproduces in the sequence which heard this CD before" to a user, if started.

[0052] When a user answers with "yes" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result,

displays the animation which an agent walks to CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and pushes a playback carbon button, and ends.

[0053] In response to a response result, the agent manager 3 is in response alternative" from the action information 42, acquires skip information for AP control script corresponding to "from an event DB6 with ejection and event are recording / study means 32, and notifies CD playback command which shows reproductive \*\*\*\* by the AP control means 35 to the CD playback AP 2 (step S205).

[0054] The CD playback AP 2 will be reproduced along with \*\*\*\* CD playback command indicates CD to be, if CD playback command which shows reproductive \*\*\*\* is received (step S105).

[0055] On the other hand, when a user answers with "no" and voice, the agent metaphor manager 5 inputs a response result through the response input means 53 from the speech recognition engine 7, notifies the agent manager 3 of a response result, displays the animation which an agent walks to CD regenerative-apparatus image in the room shell 1 with the animation display means 51, and pushes a playback carbon button, and ends.

[0056] the agent manager 3 -- a response result -- winning popularity -- the response alternative from the action information 42 -- AP control script corresponding to "no" -- ejection -- While accumulating the information on the purport which was not reproduced in the sequence which the class and user of CD played with event are recording / study means 32 heard before that CD was in an event DB6 CD playback command which reproduces music from the beginning by the AP control means 35 is notified to the CD playback AP 2 (step S205).

[0057] The CD playback AP 2 will play CD from the beginning, if CD playback command is received (step S105).

[0058] On the other hand, in terminating the CD playback AP 2, it clicks the termination carbon button in CD regenerative-apparatus image to which the enlarged display of [ in the room shell 1 ] was carried out. Then, the reduced display of the CD regenerative-apparatus image is carried out within the room shell 1, advice of communication termination is told to the agent manager 3 from the CD playback AP 2 (step S106), and the CD playback AP 2 ends processing (step S107).

[0059] The agent manager 3 will do the unload of the AP control manager 4 corresponding to the CD playback AP 2 from memory 102, if advice of communication termination is received (step S206).

[0060] In addition, although explanation of actuation of the above-mentioned example explained as an example of household electric appliances AP taking the case of the case of the CD playback AP 2, it cannot be overemphasized that it becomes the actuation which is mostly similar also in the case of telephone control [ the FAX control AP, the TV control AP, ] AP.

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DESCRIPTION OF DRAWINGS

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## [Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the configuration of the agent interface method for household-electric-appliances personal computers concerning one example of this invention.

[Drawing 2] It is the block diagram which illustrates the hardware configuration of the household-electric-appliances personal computer with which the agent interface method for household-electric-appliances personal computers of this example is applied.

[Drawing 3] It is drawing showing the example of a content of AP event reference table in drawing 1.

[Drawing 4] It is drawing showing an example of the communication procedure of the agent communication interface in drawing 1.

[Drawing 5] It is drawing which illustrates the condition that the mouse cursor was positioned by CD regenerative-apparatus image in the room shell in drawing 1.

[Drawing 6] It is drawing which illustrates the condition that CD regenerative-apparatus image was expanded in the room shell in drawing 1.

[Drawing 7] Even if CD regenerative-apparatus image is reduced into the room shell in drawing 1, the condition of the CD playback AP is drawing which illustrates the condition that the reduced display is carried out.

[Drawing 8] It is drawing which illustrates the condition that an animation indication of the agent was given, in the room shell in drawing 1.

## [Description of Notations]

1 Room Shell

2 CD Playback AP

3 Agent Manager

4 AP Control Manager

5 Agent Metaphor Manager

6 Event DB

7 Speech Recognition Engine

8 Speech Synthesis Engine

11 Household-Electric-Appliances AP Starting Means

12 Animation Display-Processing Means

21 Advice Means of Event

22 Advice Means of Household-Electric-Appliances AP Information

31 Table Registration Means

32 Event Are Recording / Study Means

33 Message Notification Decision Means

34 Agent Display Directions Means

35 AP Control Means

41 AP Event Reference Table

42 Action Information

51 Animation Display Means

52 Advice Means of Agent

53 Response Input Means

100 Household-Electric-Appliances Personal Computer

101 CPU

102 Memory  
103 Bus  
104 PCM Sound Codec  
105 CD-ROM Drive  
106 FAX Modem Board  
107 TV Tuner Board  
108 Sound Mixer  
109 Microphone  
110 Loudspeaker  
111 Telephone Modular  
112 Display  
113 Keyboard  
114 Mouse  
115 Telephone

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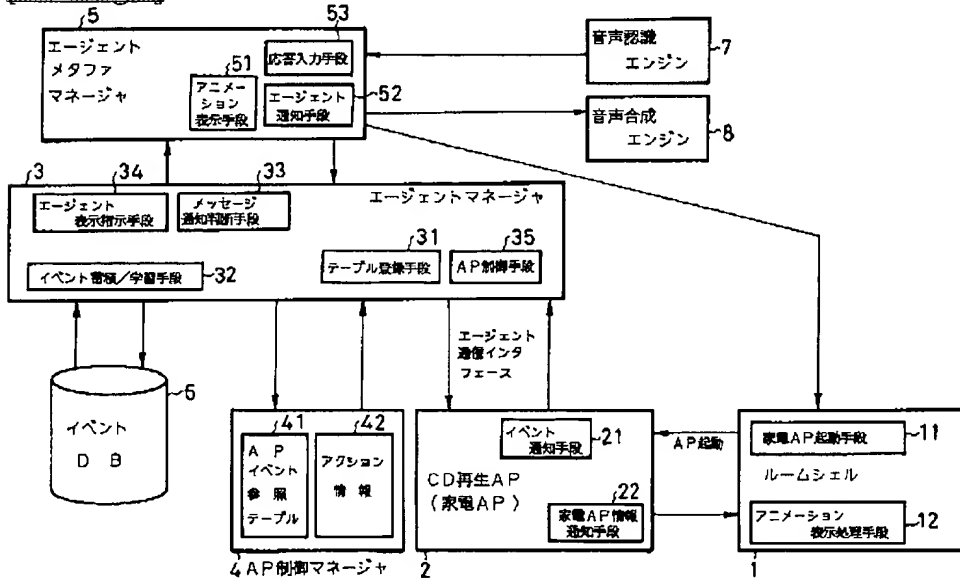
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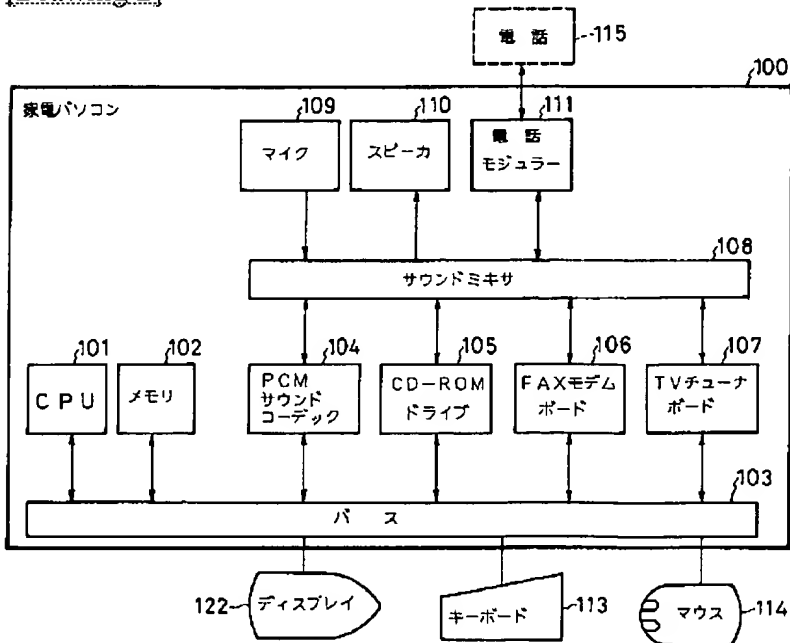
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## DRAWINGS

[Drawing 1]



[Drawing 2]

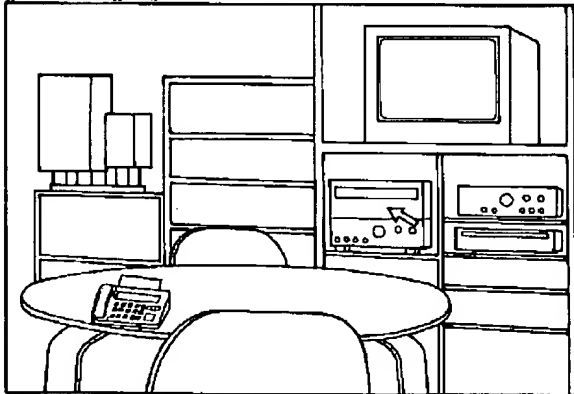


[Drawing 3]

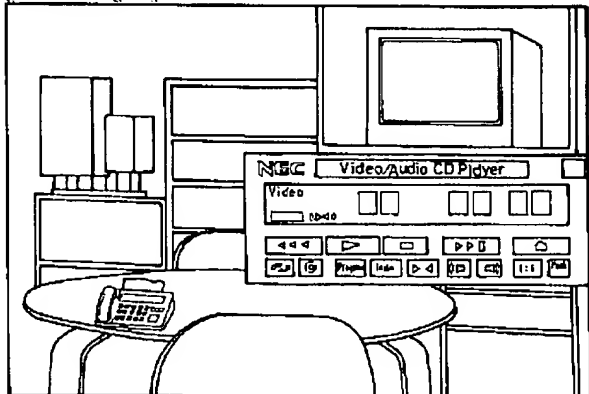


メニュー選択イベント	ユーザが選択中のメニューをエージェントマネージャに通知
メニュー実行イベント	ユーザが選択/実行したメニューをエージェントマネージャに通知
ボタン選択イベント	ユーザが選択/実行したボタンをエージェントマネージャに通知
ファイル読み込み情報	読み込んだファイル情報をエージェントマネージャに通知
ファイル書き込み情報	書き込んだファイル情報をエージェントマネージャに通知
マウスイベント	マウスの情報をエージェントマネージャに通知
キーイベント	キーの情報をエージェントマネージャに通知
AP固有の状態通知	AP固有の状態をエージェントマネージャに通知 (現在の再生位置等)
APの状態制御	エージェントマネージャの要求により、 APのイネーブル、ディセーブル、アクティブ、 非アクティブ、枠サイズ等変更
AP動作実行	エージェントマネージャの要求により、 コマンド実行。

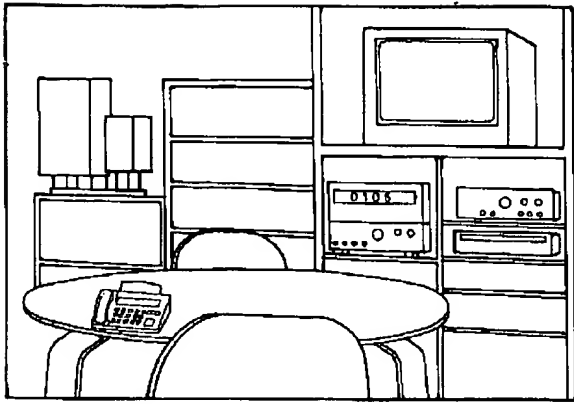
[Drawing 5]



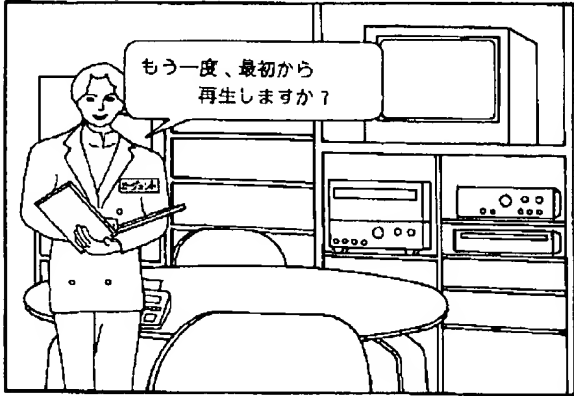
[Drawing 6]



[Drawing 7]



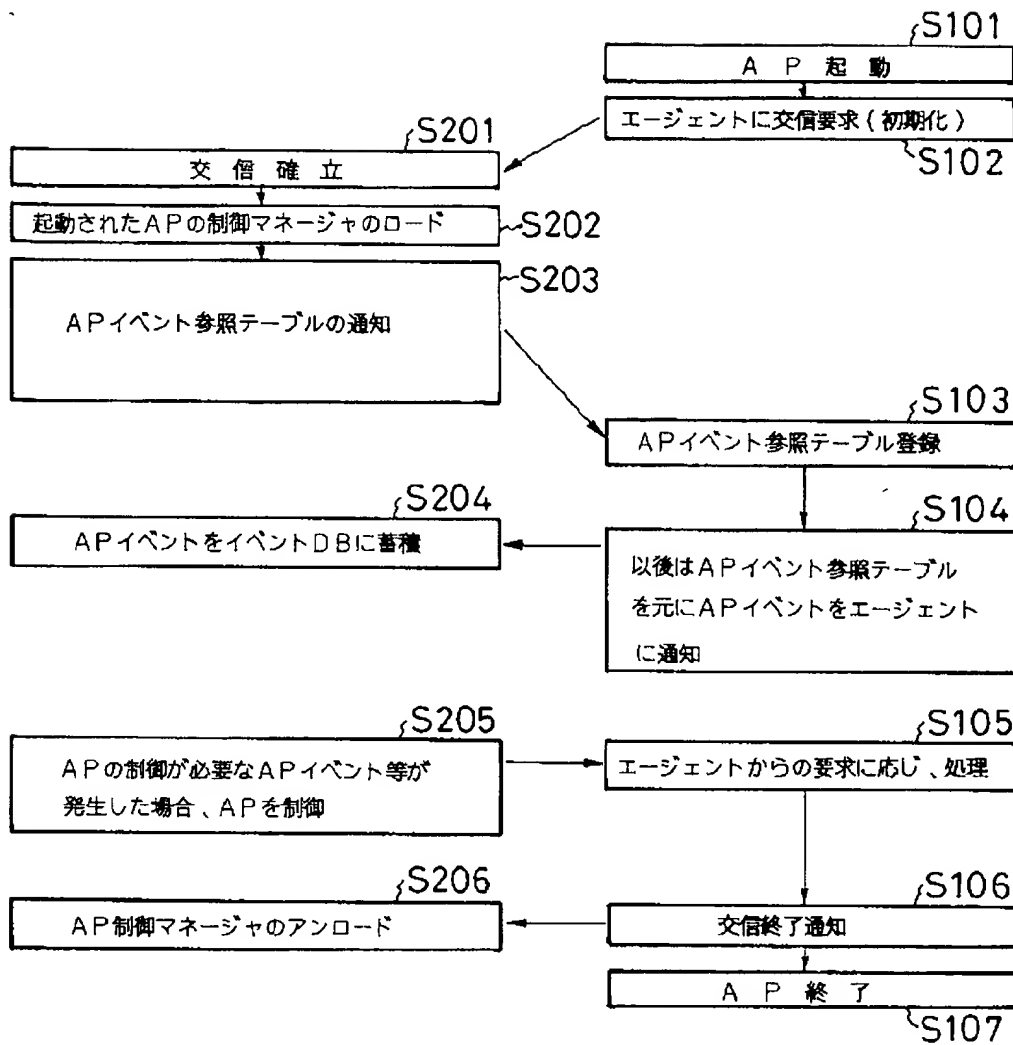
[Drawing 8]



[Drawing 4]

エージェント側

家電AP側



[Translation done.]